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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application No.: 10/800,580 Confirmation No.: 1657
Applicant: Kenji Inoue
Filed: March 15, 2004
TC/A.U.: 1794
Examiner: Elizabeth M. Cole
Customer No.: 00270
Title: Wet Paper Web Transfer Belt

BRIEF ON APPEAL

MAIL STOP Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief follows a Notice of Appeal filed on January 29, 2009.

The appeal is from the final rejection of claims 1 and 5 in the Office Action dated October 31, 2008.

U.S. Patent Application No. 10/800,580
Appeal Brief
March 27, 2009

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¹ US Patent Publication No. 2002/0137416.

I. Real Party in Interest

The real party in interest is the Applicant's assignee:

Ichikawa Co., Ltd., a Japanese corporation located at 14-15, Hongo 2-chome, Bunkyo-ku, Tokyo, Japan.

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II. Related Appeals and Interferences

None.

III. Status of Claims

The pending claims are claims 1 and 5. Claims 1 and 5 (all pending claims) are rejected and are the subject of this appeal.

Claims 1 and 5 stand rejected.

IV. Status of Amendments

No claims were amended after final rejection. There are no outstanding amendments.

V. Summary of Claimed Subject Matter

Independent claim 1 is directed to a wet paper transfer belt for use in the press part of a closed draw papermaking machine². The wet paper transfer belt comprises a base body, a wet paper web side layer having a wet paper web side surface, and a machine side layer³. The wet paper web side layer comprises an elastic section consisting of urethane resin and a fiber body⁴. Fibers composed of a part of the fiber body are exposed on the wet paper web side surface⁵, and substantially all of the fibers exposed on the wet paper web side surface are hydrophilic⁶. The exposed fibers are capable of holding an amount of water from a wet paper web⁷ in contact with the wet paper web side surface of the transfer belt⁸ sufficient to attach the wet paper web to the transfer belt for transfer of the wet paper web from the press part to a next stage in the papermaking machine⁹.

Dependent claim limits the fibers of the fiber body to fibers from the group consisting of nylon fibers, vinylon fibers, rayon fibers, cotton fibers and wool fibers¹⁰.

No separate arguments are being made for dependent claim 5.

² This language is supported at page 4, lines 12-16.

³ This language is supported at page 4, lines 12-16.

⁴ This language is supported at page 4, lines 16-20.

⁵ This language is supported at page 4, lines 16-20.

⁶ This language is supported at page 4, lines 20-23.

⁷ This language is supported at page 4, lines 28-30.

⁸ This language is supported at page 4, line 25- page 5, line 3.

⁹ This language is supported at page 4, line 25- page 5, line 3.

¹⁰ This language is supported at page 6, lines 26-30.

VI. Grounds of Rejection to be Reviewed on Appeal

The sole issue of appeal is whether or not the Examiner erred in rejecting claims 1 and 5 as unpatentable under 35 U.S.C. §102(b) over Hagfors et al¹¹.

¹¹ US Patent Publication No. 2002/0137416

VII. Argument

The examiner erred in rejecting claims 1-3 as unpatentable under the provisions of 35 U.S.C. §102(b) over Hagfors et al.¹² Applicant requests reversal of the outstanding rejections for the reasons set forth herein.

Briefly, the Applicant's invention resides in a wet paper web transfer belt in which substantially all of the fibers exposed on said wet paper web side surface are hydrophilic, such that the exposed fibers are capable of holding an amount of water from a wet paper web in contact with the wet paper web side surface of the transfer belt sufficient to attach the wet paper web to the transfer belt for transfer of the wet paper web from the press part to a next stage in the papermaking machine.

The Rejection

The Examiner rejected claims 1 and 5 under the provisions of 35 USC §102(b), finding that Hagfors teaches the claim limitation that “substantially all of the exposed fibers are hydrophilic”.

¹² US Patent Publication No. 2002/0137416

The Error

The Examiner's rejection relies on a misinterpretation of an essential aspect of the invention of Hagfors, particularly in the conclusion that because Hagfors states that "[t]he fibers in the fiber batt layer may differ from one another with regard to their polarity, hydrophilicity, electric charge, surface energy, friction properties [and] degree of fineness or porosity[,]. . . Hagfors does not require that the fibers of the batt layer differ in that one is hydrophilic and one is hydrophobic"¹³.

Hagfors is clear that it is the presence of both hydrophilic and hydrophobic fibers that produces the hydrophilic and hydrophobic areas

As is reiterated several times throughout the specification, the transfer belt of Hagfors is:

characterized in that the transfer belt surface facing the fiber web is provided with hydrophilic and, correspondingly, hydrophobic areas and that the hydrophilic and hydrophobic areas are formed by providing the fiber batt layer of the transfer belt with at least two fibers having different surface properties.¹⁴

The hydrophobic and hydrophilic areas are an essential aspect of Hagfors' invention¹⁵, as they allow the fiber web to easily detach from the transfer belt¹⁶.

¹³ Office Action of October 31, 2008, paragraph 5.

¹⁴ Hagfors, paragraph 0006 (emphasis supplied).

¹⁵ *Id.* at paragraph 0023.

¹⁶ *Id.* at paragraph 0008.

Paragraph 0013 and Fig. 2 make it clear that it is the presence of both hydrophilic and hydrophobic *fibers* that produces the hydrophilic and hydrophobic areas. Paragraph 0013 refers to areas 5a and 5c in Fig. 2 as being “made of different *fibers* from one another, lighter areas 5a being hydrophobic and darker areas 5b being hydrophilic”.¹⁷ This passage leaves no doubt that Hagfors relies on the presence of hydrophilic and hydrophobic fibers at the belt surface, and that it is the fibers themselves that afford the hydrophilic and hydrophobic areas of the belt surface. See also, for example, paragraphs 0007, 0006 and 0012, all of which make it clear that it is the plural, different, fiber properties that result in the production of both hydrophilic and hydrophobic areas.

The only possible theory under which all of Hagfors’ fibers could be hydrophilic and yet the belt surface would have both hydrophilic and hydrophobic areas would be that the surface properties of some of the hydrophobic fibers allow the belt surface to be hydrophilic where those fibers are located, while the surface properties of the other hydrophilic fibers allow the hydrophobic properties of the polymer matrix to prevail over the hydrophilic properties of the fibers in those areas where the latter fibers are located. However, Hagfors specification does not include any reference to a belt of this type, or give any other possible explanation.

Hagfors contains only one reference, in Example 2, to a belt that allegedly

¹⁷ Emphasis supplied.

contains only hydrophilic fibers. Even assuming, *arguendo*, that the reference is not in error, the belt described in Example 2 does not support the above mentioned theory. Instead Example 2, which describes the use of only PA fibers (which the Examiner admits are hydrophilic¹⁸), also describes the use of polycarbonate urethane as the polymer for impregnation of the belt. The Examiner presents no evidence that polycarbonate urethane is anything other than a *hydrophilic* polymer. The use of all hydrophilic fibers and a hydrophilic polymer would not produce a belt with “hydrophilic and, correspondingly, hydrophobic areas”¹⁹.

Considering that nothing in Hagfors indicates that the above “theory” is what is intended by the invention²⁰, there is no other legitimate theory that allows for the “essential” hydrophobic and hydrophilic “areas” other than ²¹ the presence of both hydrophilic and hydrophobic *fibers*.

Example 2 is in error

The Examiner points to Example 2 of Hagfors as allegedly teaching the limitation of Applicant’s invention that “substantially all of the exposed fibers are hydrophilic”. However, the weight of the evidence shows that this interpretation is not consistent with the interpretation of one of skill in the art.

¹⁸ Office Action dated October 31, 2008, paragraph 4.

¹⁹ Hagfors, paragraph 0006.

²⁰ On the contrary, as described above, Hagfors specification contravenes this theory.

²¹ *Id.* at paragraph 0023.

The Office must interpret a prior art reference in the manner in which it would have been understood by a person skilled in the art²². Moreover, an inadvertent and unintended disclosure in a reference is not an anticipation if a person skilled in the art would perceive it as a mistake²³. Where a reference can be interpreted in one of two or more possible ways, the overall teaching of the reference may be taken into account in determining whether or not the one interpretation is the correct interpretation.

Example 2 describes a fabric comprising “34% of 3.1 dtex PA fiber, 33% of 11 dtex PA fiber and 33% of PA fiber.” While on its face this wording does not specifically identify any hydrophobic fibers, it is Applicant’s position that a person of skill in the art, reading the quoted passage in context with the remainder of the specification, would conclude that this is likely an error, as the term “PA”, without qualification, does not make sense.

This error is evident from the absence of a specified linear density for the third group of “PA” fibers. Why, if Hagfors intended to specify three different groups of PA fibers, would he supply linear densities (dtex numbers) for the first two groups, and not say anything at all about the third group? The only plausible explanation is that the third group does not consist of PA fibers at all, but instead

²² *In re Paulsen*, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994).

²³ *Edison Electric Light Company v. Novelty Incandescent Lamp Co.*, 167 F. 977 (3rd. Cir. 1909).

consists of other fibers, such as PE fibers, the linear density of which doesn't matter.

This interpretation is supported by the Declaration of Applicant submitted on September 2, 2008²⁴. The Declaration demonstrates that, despite the vagueness of Hagfors' description, a person skilled in the art of papermaking belts would not understand Hagfors to describe anything other than a transfer belt having both hydrophilic and hydrophobic fibers exposed on the wet paper web contacting side.

Furthermore, the fact that Hagfors is concerned with detachment should be taken into account in interpreting the content of Hagfors' disclosure and in determining how it would have been understood by one of skill in the art. Hagfors states that following compression "the micro-roughness of the surface is restored and the water film breaks into drops. The water then enters the hydrophilic areas and leaves the hydrophobic areas. As a result, the fiber web is no longer firmly attached to the transfer belt, but it can be easily detached from it."²⁵ To interpret Hagfors in a way that does not allow for both hydrophobic and hydrophilic areas, which is the case if Example 2 is interpreted as written, would render the invention inoperable for its primary purpose.

²⁴ Reproduced in the Evidence Appendix.

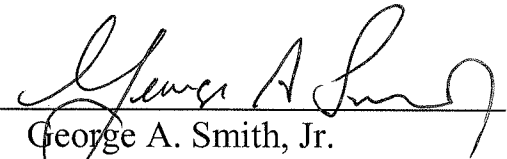
²⁵ Hagfors, paragraph 0008.

The weight of the evidence shows that the hydrophobic and hydrophilic character of the surface of the Hagfors belt results in all cases from the presence of both hydrophobic and hydrophilic fibers in the surface of the belt.

Conclusion

For the reasons given above, we submit that the Examiner has improperly rejected claim 1 and its dependent claim 5, and respectfully request reversal of the rejection.

Respectfully submitted
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VIII. Claims Appendix

1 (previously presented). A wet paper transfer belt for use in the press part of a closed draw papermaking machine, comprising a base body, a wet paper web side layer having a wet paper web side surface, and a machine side layer, wherein said wet paper web side layer comprises an elastic section consisting of urethane resin and a fiber body, fibers composed of a part of the fiber body are exposed on said wet paper web side surface, and substantially all of the fibers exposed on said wet paper web side surface are hydrophilic and said exposed fibers are capable of holding an amount of water from a wet paper web in contact with the wet paper web side surface of the transfer belt sufficient to attach the wet paper web to the transfer belt for transfer of the wet paper web from the press part to a next stage in the papermaking machine.

2-4 (cancelled).

5 (previously presented). A wet paper web transfer belt as claimed in claim 1, wherein the fiber body consists of fibers from the group consisting of nylon fibers, vinylon fibers, rayon fibers, cotton fibers and wool fibers.

IX. Evidence Appendix

Patent Literature

- A. U.S. Patent Publication No. 2002/0137416
Cited by Examiner in Office Action of 11/29/2007
 (“Hagfors”) 19

Cases

- B. *In re Paulsen*,
31 USPQ2d 1671, 1673 (Fed. Cir. 1994) 24
- C. *Edison Electric Light Company v.*
Novelty Incandescent Lamp Co.,
167 F. 977 (3rd. Cir. 1909) 16

Other Evidence

- D. Declaration of Applicant, Kenji Inoue
Submitted with the Response of September 2, 2008
 (“Declaration of Applicant”) 21



US 20020137416A1

(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2002/0137416 A1**
(43) **Pub. Date: Sep. 26, 2002**(54) **TRANSFER BELT FOR A PAPER MACHINE**(30) **Foreign Application Priority Data**

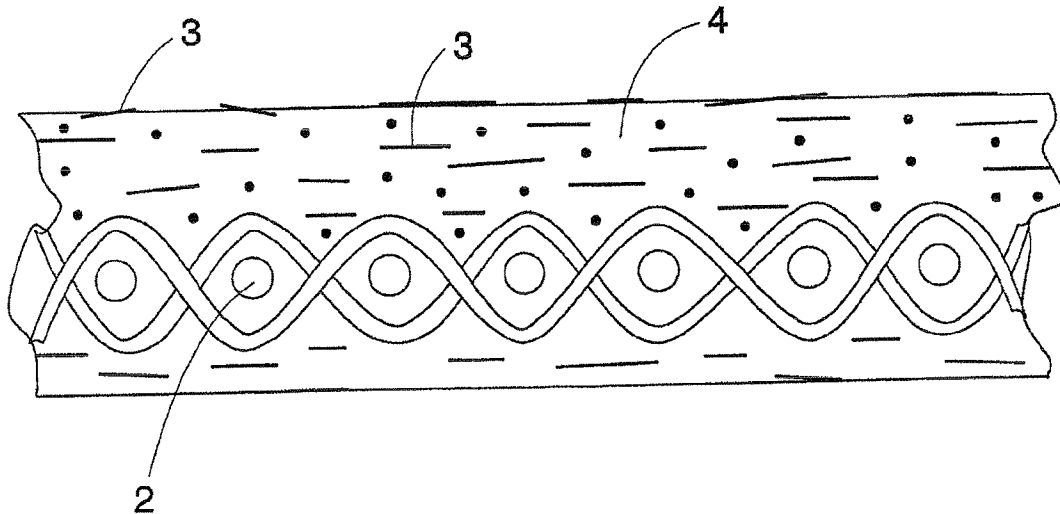
Oct. 13, 1999 (FI)..... 19992207

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ALEXANDRIA, VA 22320 (US)(51) **Int. Cl.⁷** **B32B 5/02; B32B 27/12**(52) **U.S. Cl.** **442/118; 442/153**(57) **ABSTRACT**

Transfer belt for a paper machine, comprising a base structure (2) and a fiber batt layer (3) attached to the base structure and facing the fiber web. At least the fiber batt layer side of the belt is provided with a polymer matrix (4) impregnating the fiber batt layer (3). According to the idea of the invention, the transfer belt fiber batt layer comprises at least two fibers with different surface properties, the transfer belt surface facing the fiber web being thus provided with hydrophilic and, correspondingly, hydrophobic areas. The fibers in the fiber batt layer may differ from one another with regard to their polarity, hydrophilicity, electric charge, surface energy, friction properties, degree of fineness or porosity.

(73) Assignee: **TAMFELT OYJ ABP, Tampere (FI)**(21) Appl. No.: **10/098,054**(22) Filed: **Mar. 15, 2002****Related U.S. Application Data**

(63) Continuation of application No. PCT/FI00/00883, filed on Oct. 12, 2000.



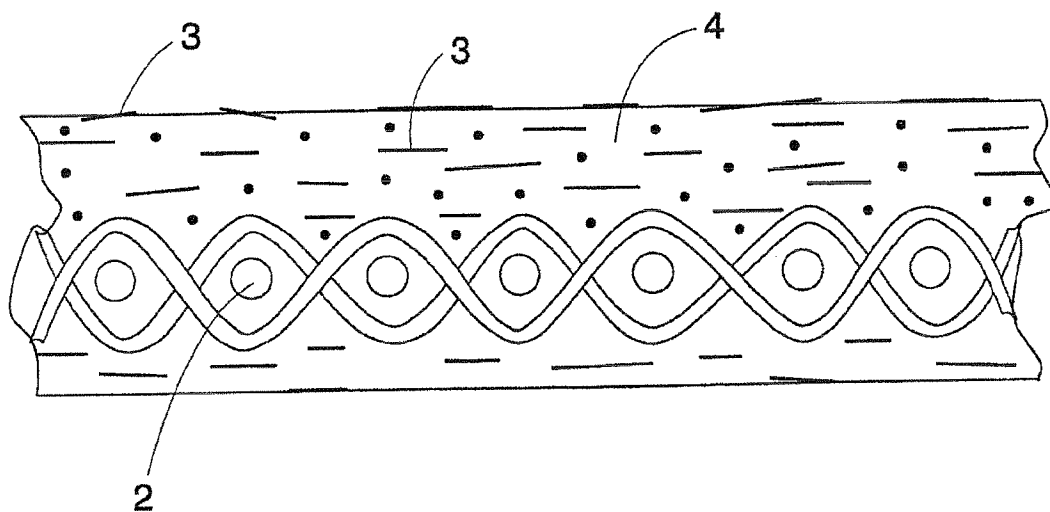


FIG. 1

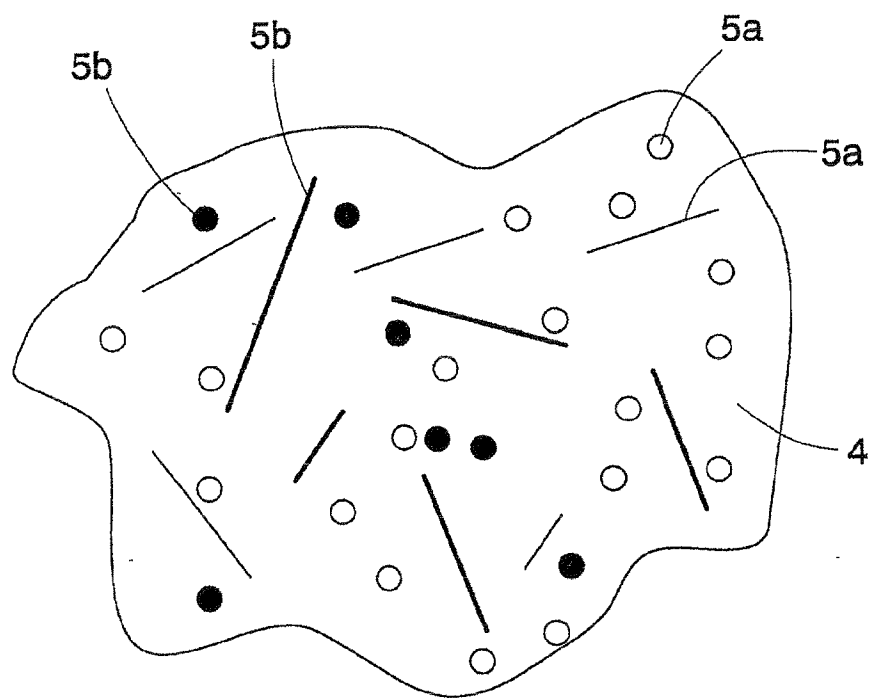


FIG. 2

TRANSFER BELT FOR A PAPER MACHINE

FIELD OF THE INVENTION

[0001] This application is a Continuation of International PCT/FI00/00883 filed Oct. 12, 2000 which designated the U.S. and was published under PCT Article 21(2) in English.

[0002] The invention relates to a transfer belt for a paper machine, the transfer belt comprising a base structure, a fibre batt layer attached to the base structure and arranged to face the fibre web, and a polymer matrix arranged at least on the fibre batt layer side to impregnate the fibre batt layer, the fibres batts extending to the surface of the polymer matrix on the belt surface facing the fibre web.

BACKGROUND OF THE INVENTION

[0003] Transfer belts coated with a polymer or those impregnated throughout with a polymer material have been disclosed in various publications, such as U.S. Pat. Nos. 4,483,745; 4,976,821; 4,500,588; and 4,529,643. In addition, such belts have been described in Finnish Patents 64959 and 64960.

[0004] This kind of a transfer belt is typically made by coating a conventional support structure with a polymer material, or by filling the fabric structure entirely with the polymer material. It is also known to impregnate so-called paper machine felt, i.e. to needle a fibre batt layer onto a woven structure, with a polymer material.

[0005] A transfer belt is used for transferring the fibre web for example from a press felt or a press fabric forward to a press nip, for transferring it from the press nip onward and finally for transferring the fibre web to another texture or belt. The transfer belt can also be used for other purposes in the paper machine to transfer the fibre web from one process stage to another. A typical feature in these applications is that the fibre web follows more easily a surface to which the force caused by water contained in the fibre web best attaches the web. Therefore the fibre web follows most easily a substantially smooth surface impermeable to water and/or air. An essential problem is that it is difficult to detach the fibre web from this kind of known surface structure, particularly when the fibre web is still wet.

BRIEF DESCRIPTION OF THE INVENTION

[0006] It is an object of the present invention to provide a transfer belt which has suitable surface properties allowing the fibre web to be detached from the belt in a desired manner and ensuring, at the same time, an advantageous transfer belt behaviour during the pressing stage.

[0007] The transfer belt of the invention is characterized in that the transfer belt surface facing the fibre web is provided with hydrophilic and, correspondingly, hydrophobic areas and that the hydrophilic and hydrophobic areas are formed by providing the fibre batt layer of the transfer belt with at least two fibres having different surface properties.

[0008] An essential idea of the invention is that the transfer belt surface facing the fibre web is made of a fibre layer impregnated with a polymer and comprising fibres of different surface properties. The fibres may differ from one another with respect to their polarity, hydrophilicity, electric charge, surface energy, friction properties or porosity, the

transfer belt surface being thus provided with areas having different properties. Another essential idea of the invention is that the surface is ground to be suitably smooth, the fibres on the surface maintaining, however, a certain micro-roughness on it. This roughness can be controlled not only by the roughness of the abrasive means but also by the degree of fineness of the fibre. Hence, when the transfer belt is subjected to compression, the surface becomes smooth and the water included in the fibre web forms a film which spreads evenly onto the surface. Correspondingly, when the compression ceases, the micro-roughness of the surface is restored and the water film breaks into drops. The water then enters the hydrophilic areas and leaves the hydrophobic areas. As a result, the fibre web is no longer firmly attached to the transfer belt, but it can be easily detached from it.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention will be described in greater detail in the accompanying drawing, in which

[0010] FIG. 1 is a schematic, cross-sectional view of a transfer belt structure of the invention, and

[0011] FIG. 2 is a schematic, enlarged top view of the surface of the transfer belt of the invention in its non-compressed form.

DETAILED DESCRIPTION OF THE INVENTION

[0012] FIG. 1 is a schematic, cross-sectional view of a transfer belt structure of the invention. The transfer belt 1 comprises a base structure 2, which may be any ordinary woven or non-woven texture. The base structure 2 has batt fibres 3 needled thereto to form a fibre batt layer onto its outer surfaces. In addition, the transfer belt 1 further comprises a polymer material 4 applied to the belt surface facing the fibre web, i.e. the upper surface in the Figure, to impregnate the fibre batt layer of the belt. The polymer matrix 4 thus formed is then ground so that an outer surface of a desired roughness is obtained, the batt fibres extending to the surface of the polymer layer. The transfer belt is most preferably ground so that its roughness value $Rz > 2 \mu m$ to allow a sufficient degree of roughness to be obtained. To allow the desired properties to be achieved in the manufacture of the transfer belt, the fibre batt layer is made by mixing together suitable fibres which are selected on the basis of their hydrophilicity, hydrophobicity, resistance to wear, degree of fineness, etc. so that suitably differing properties will be obtained. These different fibres can be mixed together in a suitable manner and then attached to the base structure for example by needling, as a result of which a suitable distribution of different fibres is produced. Next, at least the transfer belt layer facing the fibre web is entirely impregnated with the polymer material. Finally, the polymer layer is ground to a suitable roughness, whereby fibres are exposed on the surface of the transfer belt. The structure thus formed provides a transfer belt surface having suitably alternating hydrophilic and hydrophobic areas, the transfer belt therefore behaving in a desired manner during stages of compression and non-compression alike.

[0013] FIG. 2, in turn, shows an embodiment of a transfer belt surface according to the invention seen from the surface side when the transfer belt is not subjected to compression. Darkening has been used in the FIG. 2 to distinguish areas

5a and **5b** made of different fibres from one another, lighter areas **5a** being hydrophobic and darker areas **5b** hydrophilic. The fibre web adheres to the uniform water layers on the darker areas **5b** of the transfer belt, but tends to detach from areas **5a** due to their water-repellent properties. Hence the fibre web does not adhere firmly to the transfer belt but is easy detach from it.

[0014] The fibre material to be used may vary depending on the purpose of use and the fibre web to be processed. The hydrophilic fibres that may be used include cellulose, viscose, animal fibres, polyvinyl alcohol, various polyamides, polyacrylnitrile, etc. Correspondingly, the hydrophobic fibres that may be used include fluoridated fibres, such as polytetrafluoroethylene and polyvinyliden fluoride, polyolefines, such as polyethylene and polypropylene, polyesters, such as polyethylene terephthalate and polybutylene terephthalate, and the like. In addition, different glass, carbon or metal fibres can be used.

[0015] The fineness of the batt fibres may be for example 3.1-67 dtex, or they may even be microfibrils having a fineness of less than 2 dtex. The fibres may be either of the same degree or of different degrees of fineness, and their length may be typically 10 to 150 mm before needling. When rougher fibres are used, the end result is also a rougher surface, and the web detaches more easily. Different combinations of the polymer and the fibres to be used can thus be chosen according to the purpose of use. The fibres may also have different cross-sectional profiles, for example annular or angled. Further, the outer surface of the fibres may be treated with a suitable coating agent to facilitate the manufacturing.

[0016] The polymer used in the impregnation may be polyurethane, polycarbonate urethane, polyacrylate, or their mixture, or another polymer suitable for the purpose. The hydrophilicity or hydrophobicity of the polymer is preferably substantially different than that of the fibre used.

[0017] In the following, two examples of possible transfer belt structures will be described.

EXAMPLE 1

[0018] The transfer belt base is made of ordinary, woven press felt support fabric weighing 640 g/m² to which 1000 g/m² of fibre mixture is needed, the fibre mixture comprising 20% of 3.1 dtex UHMW-PE (Ultra High Molecular Weight Polyethylene) fibre and 80% of 6.7 dtex PA 6 fibre. 800 g/m² of the fibre is on the belt side facing the paper web and 200 g/m² is on the roller side of the belt.

[0019] The belt side facing the paper web is impregnated with a polyurethane water dispersion, the water dispersion being treated by applying heat and a suitable agent. The belt surface is made smooth by grinding it with an abrasive paper of fineness grade 180. After the abrasion, the belt surface is provided with hydrophobic PE areas and hydrophilic PA areas, with polyurethane as the matrix.

EXAMPLE 2

[0020] The support fabric described above is provided with 1000 g/m² fibre mixture needled thereto, the mixture comprising 34% of 3.1 dtex PA fibre, 33% of 11 dtex PA fibre and 33% of PA fibre. The belt is impregnated with a polycarbonate urethane dispersion which is treated by apply-

ing heat and a suitable agent. The surface is ground with an abrasive paper of fineness grade 60. After the abrasion, the surface has a micro-roughness provided by hydrophilic PA areas of various sizes and varying roughness, with polycarbonate urethane used as the matrix.

[0021] Further, in cases where the felt structure is to be blocked by applying the polymer to one side of the felt only, it is possible to arrange a blocking layer between the support fabric and the fibre batt layer to prevent the polymer from being absorbed through the felt. The paper web side can thus be impregnated so that it is completely clogged, without the risk of the polymer penetrating entirely through the transfer belt. This kind of a blocking layer can be provided for example by means of a plastic film, a meltable non-woven fabric, or a molten fibre layer which melts into a uniform blocking layer when subjected to thermal treatment. The blocking layer in question is made of polyethylene, polypropylene, copolyamide or a similar material which melts at a low temperature. After the fibre batt layer is needled, the blocking layer still comprises through pores, but the thermal treatment to which the blocking layer material is then subjected melts the material, whereby an impervious, or at least nearly impervious, blocking layer is formed. The following example illustrates this kind of a transfer belt structure:

EXAMPLE 3

[0022] A lighter support fabric weighing 500 g/m² is used. The fibre used may consist of the same fibre mixture as the one in Example 1. Between the support fabric and the fibre there is provided a meltable fibre, or a non-woven fabric layer, weighing 20 - 80 g/m².

[0023] The specification and the accompanying drawings only describe the invention with reference to an example, the invention being in no way restricted to it. An essential aspect is that the fibre batt layer attached to the woven base structure to form the transfer belt is treated with a polymer material so that at least the fibre batt layer portion facing the fibre web is impregnated with the polymer material, the surface of the polymer matrix being then ground so that the batt fibres reach the surface of the transfer belt. A test that was carried out showed that a transfer belt roughness where $2 < R_z < 80 \mu\text{m}$ and $1 < R_a < 30 \mu\text{m}$ is advantageous. Another essential aspect of the invention is that the fibre batt layer material and the polymer layer chosen for the belt are used for forming different areas having differing surface properties due to which water tends to collect in some areas of the transfer belt and to leave others, thereby allowing the fibre web to be more easily detached from the surface of the transfer belt. The polymer matrix can be formed by impregnating the fibre batt layer only on the surface facing the fibre web. Another alternative to form the matrix is to impregnate a thicker portion of the transfer belt, or the entire transfer belt. The impregnating layer can also be formed on both surfaces of the transfer belt in such a way that the belt's core portion is left unimpregnated.

What is claimed is:

1. A transfer belt for a paper machine, comprising:
 - a base structure,
 - a fibre batt layer attached to the base structure and arranged to face the fibre web,

a polymer matrix arranged at least on the fibre batt layer side to impregnate the fibre batt layer,

the batt fibres extending to the surface of the polymer matrix on the belt surface facing the fibre web,

the transfer belt surface facing the fibre web is provided with hydrophilic and, correspondingly, hydrophobic areas, and

the hydrophilic and hydrophobic areas are formed by providing the fibre batt layer of the transfer belt with at least two fibres having different surface properties.

2. A transfer belt according to claim 1, wherein the surface of the transfer belt is ground in connection with the manufacture to a roughness where $Rz > 2 \mu\text{m}$.

3. A transfer belt according to claim 1, wherein the batt fibres are mixed together before they are needled.

4. A transfer belt according to claim 1, wherein the transfer belt comprises batt fibres of varying fineness.

5. A transfer belt according to claim 1, wherein the impregnating material is polyurethane.

6. A transfer belt according to claim 1, wherein the hydrophilic fibres used include at least some of the following materials: cellulose, viscose, polyvinyl alcohol, polyamides, and polyacrylonitriles.

7. A transfer belt according to claim 1, wherein the hydrophobic fibres used include at least some of the following materials: fluoridated fibres, polytetrafluoroethylene, polyvinyliden fluoride, polyolefines, such as polyethylene and polypropylene, polyesters, polyethylene terephthalate, and polybutylene terephthalate.

8. A transfer belt according to claim 1, wherein the base structure is a paper machine fabric.

9. A transfer belt according to claim 1, wherein the transfer belt is provided with a blocking layer between the base structure and the fibre batt layer, whereby only the fibre batt layer on the fibre web side of the transfer belt is impregnated with the polymer matrix.

10. A transfer belt according to claim 9, wherein the blocking layer is made of a polymer which melts at a low temperature, and that the blocking layer is sealed after the needling phase by subjecting the transfer belt to a thermal treatment which closes up the pores in the blocking layer structure, thereby rendering the blocking layer substantially impermeable.

11. A transfer belt according to claim 1, wherein the transfer belt is substantially entirely impregnated with the polymer matrix.

* * * * *

**U.S. Court of Appeals
Federal Circuit**

In re Paulsen

No. 94-1012

Decided August 3, 1994

PATENTS

1. Patent construction — Claims — In general (§125.1301)

Preamble does not limit scope of claim if it merely states invention's purpose or intended use, but terms appearing in preamble may be deemed limitations if they give meaning to claim and properly define invention; patent should be reviewed in its entirety to determine whether inventor intended preamble language to represent additional structural limitation or mere introductory language.

2. Patentability/Validity — Anticipation — Prior art (§115.0703)

Patent construction — Claims — Defining terms (§125.1305)

Term "computer" lacks any standard definition but is commonly understood by those skilled in art to encompass, at most fundamental level, device that is capable of carrying out calculations, and thus prior art reference which discloses calculator meets all limitations of claims for portable computer, in view of lack, in patent specification, of any specialized definition that would restrict claimed invention to computer having specific set of characteristics and capabilities;

claims were thus properly rejected as being anticipated by prior art reference.

3. Patentability/Validity — Obviousness — Relevant prior art — Particular inventions (§115.0903.03)

References which pertain to different field of endeavor may still be analogous prior art if they are reasonably pertinent to particular problem with which inventor is involved; thus, references which disclose various means of connecting cover to device so that cover is free to swing radially along connection axis are pertinent to problem faced by inventors of claimed portable computer, in terms of how to connect and secure computer's display housing to computer while meeting certain size constraints and functional requirements, and thus constitute analogous prior art.

4. Patentability/Validity — Obviousness — Commercial success (§115.0908)

Evidence of commercial success is entitled to weight only if shown to be relevant to claims at issue, and thus commercial success enjoyed by laptop computers, although impressive, is nevertheless not entitled to weight, in view of lack of evidence showing that such success is attributable to computer within scope of claims at issue, rather than to extraneous factors such as advertising or marketing, or to features possessed by computers of claims found to be unpatentable.

Particular patents — Electrical — Portable computer

4,571,456, Paulsen, Edens, Nakamura, Gallatin, Hobson, and Moggridge, portable computer, rejection on re-examination of claims 1-4, 6, 9-12, and 18-34 affirmed.

Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Requests for re-examination, nos. 90/002,014, 90/002,053, and 90/002,179, consolidated into single re-examination proceeding. From decision of the Board of Patent Appeals and Interferences sustaining final rejection of claims, patentees appeal. Affirmed.

J. Georg Seka, of Townsend and Townsend Hourie and Crew, San Francisco, Calif., for appellant.

Harris Pitlick and Fred E. McKelvey, PTO, Arlington, Va., for appellee.

Before Nies, Michel, and Lourie, circuit judges.

Lourie, J.

AST Research, Inc., (AST)¹ appeals from the July 23, 1993 decision of the United States Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences sustaining the final rejection upon reexamination of claims 1-4, 6, 9-12, and 18-34 of U.S. Patent 4,571,456. We affirm.

BACKGROUND

The '456 patent, entitled "Portable Computer," was issued to David C. Paulsen *et al.*, on February 18, 1986. The claims of the patent are directed to a portable computer contained within a compact metal case.² A salient feature of the claimed invention is its "clam shell" configuration, in which the computer's display housing is connected to the computer at its midsection by a hinge assembly that enables the display to swing from a closed, latched position for portability and protection to an open, erect position for viewing and operation. Computers consistent with this design are commonly referred to as "laptop" computers.

¹ AST Research is the current record owner of the patent in issue.

² Claim 1 is the broadest claim in the '456 patent and is illustrative of the claimed invention. The claim reads as follows:

1. A portable computer constructed to be contained within an outer case for transport and to be erectable to a viewing and operating configuration for use, said computer comprising
 - a base,
 - a display housing,
 - a top cover,
 - a rear cover,
 - hinge means for permitting swinging movement of the
 - display housing about an axis of rotation adjacent the rear end of the display housing and from a closed and latched position of the display housing on the base to an erected position for viewing by an operator, and including stop means for holding the display housing at the desired angle for viewing,
 - the hinge means being located in a mid portion of
 - the base and wherein the hinge means permit swinging movement of the display housing to an erected position in which the inner surface of the display housing is held in an upward and rearwardly inclined angle for viewing by an operator in front of the computer, and
 - including a keyboard in the portion of the base which is exposed by the movement of the display housing to the erected position.

On April 27, 1990, and subsequently on June 12, 1990 and October 22, 1990, requests were filed in the PTO for reexamination of the '456 patent. See 35 U.S.C. § 302 (1988). The requests were consolidated into a single proceeding for the reexamination of claims 1 through 34.³ On August 9, 1991, the examiner issued a final office action in the reexamination rejecting claims 1-4, 6, 7, 9-12, and 18-34. Independent claims 1 and 18 were rejected under 35 U.S.C. § 102(b) (1988) as being anticipated by Japanese Application 47-14961 to Yokoyama. Additionally, claims 1-4, 6, 7, 9-12, and 18-34 were rejected under 35 U.S.C. § 103 (1988) as being obvious over the Yokoyama reference in view of other prior art.⁴

On appeal, the Board affirmed the examiner's rejections except as to claim 7. In sustaining the rejections of claims 1 and 18, the Board rejected the appellant's contention that Yokoyama is not a proper prior art reference under sections 102 or 103. The Board concluded that although Yokoyama discloses a calculator, a calculator is a type of computer. The Board also rejected the appellant's argument that Yokoyama is a non-enabling reference. Respecting the § 103 rejection of claims 2-4, 6, 9-12, and 19-34, the Board adopted the examiner's determination that the cited prior art would have suggested the claimed subject matter to a person of ordinary skill in the art.⁵

AST, the present assignee of the '456 patent, now appeals from the Board's decision.

DISCUSSION Claims 1 and 18

We first address AST's challenge to the Board's determination that claims 1 and 18 are anticipated by the Yokoyama reference. Anticipation is a question of fact subject to review under the "clearly erroneous" standard. *In re King*, 801 F.2d 1324, 1326, 231

USPQ 136, 138 (Fed. Cir. 1986). A rejection for anticipation under section 102 requires that each and every limitation of the claimed invention be disclosed in a single prior art reference. *In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990). In addition, the reference must be enabling and describe the applicant's claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention. *Id.*

The Yokoyama reference discloses a desktop calculator contained within a housing having the form of a portable attache case. The front half of the case consists of a lid that is hinged at the midsection of the case. Connected to the inside of the lid is a display which is able to be viewed when the lid is opened to a vertical position. A keyboard is also exposed for operation when the lid is opened. When the device is to be transported, the lid is closed and latched to protect the display and the keyboard. Notwithstanding that Yokoyama discloses a device meeting the express limitations set out in claims 1 and 18 relating to a base, a display housing, a keyboard, etc., AST maintains that the claims are not anticipated by Yokoyama because that reference discloses a calculator, not a computer.⁶ AST contends that the Board erred in construing the term "computer" broadly to encompass a calculator such as that disclosed in Yokoyama.

[1] We note at the outset that the term "computer" is found only in the preamble of the claims at issue. The preamble of a claim does not limit the scope of the claim when it merely states a purpose or intended use of the invention. See *DeGeorge v. Bernier*, 768 F.2d 1318, 1322 n.3, 226 USPQ 758, 761 n.3 (Fed. Cir. 1985). However, terms appearing in a preamble may be deemed limitations of a claim when they "give meaning to the claim and properly define the invention." *Gerber Garment Technology, Inc. v. Lectra Sys., Inc.*, 916 F.2d 683, 688, 16 USPQ2d 1436, 1441 (Fed. Cir. 1990) (quoting *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 896, 221 USPQ 669, 675 (Fed. Cir.), cert. denied, 469 U.S. 857 (1984)). Although no "litmus test" exists as to what effect should be accorded to words contained in a preamble, review of a patent in its entirety should be made to determine whether the inventors intended such language to represent an additional structural limitation or mere introductory language.

³ As originally issued, the '456 patent contained claims 1 through 19. New claims 20 through 34 were subsequently added during reexamination.

⁴ Claims 5, 8, and 13-17 were allowed by the examiner in the reexamination proceeding. These claims are not at issue in this appeal.

⁵ The party in interest during the reexamination proceeding was Grid Systems Corp., the original assignee of the '456 patent.

⁶ Because the Board adopted the examiner's position as its own, we shall refer to the examiner's findings and conclusions as those of the Board.

⁷ AST does not dispute that all the limitations of claims 1 and 18 are otherwise described in the Yokoyama reference.

Corning Glass Works v. Sumitomo Elec. U.S.A., Inc., 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989); *In re Stencel*, 828 F.2d 751, 754, 4 USPQ2d 1071, 1073 (Fed. Cir. 1987).

In the instant case, review of the '456 patent as a whole reveals that the term "computer" is one that "breathes life and meaning into the claims and, hence, is a necessary limitation to them." *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 866, 228 USPQ 90, 92 (Fed. Cir. 1984). Thus, to anticipate claims 1 and 18, the Yokoyama reference must disclose a type of "computer." See *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 678, 7 USPQ2d 1315, 1317 (Fed. Cir. 1988) (prior art reference must contain preamble limitations). However, to properly compare Yokoyama with the claims at issue, we must construe the term "computer" to ascertain its scope and meaning. Claim construction is a legal question that we address *de novo*. See *Carroll Touch, Inc. v. Electro Mechanical Sys., Inc.*, 15 F.3d 1573, 1577, 27 USPQ2d 1836, 1839 (Fed. Cir. 1993).

Pursuant to its practice of giving claims in a reexamination their broadest reasonable interpretation consistent with the specification, see *In re Etter*, 756 F.2d 852, 858, 225 USPQ 1, 5 (Fed. Cir. 1985), the Board construed the term "computer" to include a calculator. The Board's interpretation was supported by authoritative lexicographic sources that confirmed that a calculator is considered to be a particular type of computer by those of ordinary skill in the art. AST alleges that the Board's interpretation was erroneous because it ignores the inventors' own definition of "computer." AST asserts that the specification plainly indicates that the inventors intended to limit the claimed invention to a device having a display with graphics and text capability, sufficient data processing capacity, communication ports, a telephone connection, etc., features normally absent in a calculator.

In an effort to avoid the anticipating disclosure of Yokoyama, AST engages in a *post hoc* attempt to redefine the claimed invention by impermissibly incorporating language appearing in the specification into the claims. Although "it is entirely proper to use the specification to interpret what the patentee meant by a word or phrase in the claim, . . . this is not to be confused with adding an extraneous limitation appearing in the specification, which is improper. By 'extraneous,' we mean a limitation read into a claim from the specification wholly apart from any need to interpret . . . particular words or phrases

in the claim." *E.I. Du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433, 7 USPQ2d 1129, 1131 (Fed. Cir.), *cert. denied*, 488 U.S. 986 (1988). Moreover, when interpreting a claim, words of the claim are generally given their ordinary and accustomed meaning, unless it appears from the specification or the file history that they were used differently by the inventor. See *Carroll Touch*, 15 F.3d at 1577, 27 USPQ2d at 1840.

The term "computer" is not associated with any one fixed or rigid meaning, as confirmed by the fact that it is subject to numerous definitions and is used to describe a variety of devices with varying degrees of sophistication and complexity. However, despite the lack of any standard definition for this ubiquitous term, it is commonly understood by those skilled in the art that "at the most fundamental level, a device is a computer if it is capable of carrying out calculations." *National Advanced Sys., Inc. v. United States*, No. 93-1496, slip op. at 10 (Fed. Cir. June 8, 1994). AST cannot dispute that a calculator falls within that basic definition. That a calculator may be a "limited function" computer as opposed to a "full function" computer does not change the fact that it is nonetheless a computer.⁸

Although an inventor is indeed free to define the specific terms used to describe his or her invention, this must be done with reasonable clarity, deliberateness, and precision. "Where an inventor chooses to be his own lexicographer and to give terms uncommon meanings, he must set out his uncommon definition in some manner within the patent disclosure" so as to give one of ordinary skill in the art notice of the change. See *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1387-88, 21 USPQ2d 1383, 1386 (Fed. Cir. 1992). Here, the specification of the '456 patent does not clearly redefine the term "computer" such that one of ordinary skill in the art would deem it to be different from its common meaning. The specification merely describes in a general fashion certain features and capabilities desirable in a portable computer. This description, however, is far from establishing a specialized definition restricting the claimed invention to a com-

⁸ We are unpersuaded by the declarations submitted by the appellants which draw a distinction between a calculator and a computer based on comparative functions and capabilities. As the Board correctly concluded, such extrinsic evidence fails to rebut the premise that a calculator is a computer, albeit one with limited functions.

puter having a specific set of characteristics and capabilities.

[2] We conclude that the Board did not clearly err in determining that the Yokoyama reference meets all the limitations of claims 1 and 18 as properly construed, including the "computer" limitation.

Alternatively, AST asserts that Yokoyama does not anticipate claims 1 and 18 because it is not enabling. AST argues that Yokoyama only discloses a box for a calculator and thus does not teach how to make and use a portable calculator. This argument, however, fails to recognize that a prior art reference must be "considered together with the knowledge of one of ordinary skill in the pertinent art." *In re Samour*, 571 F.2d 559, 562, 197 USPQ 1, 3-4 (CCPA 1978); see also *DeGeorge*, 768 F.2d at 1323, 226 USPQ at 762 (Fed. Cir. 1985) (a reference "need not, however, explain every detail since [it] is speaking to those skilled in the art"). As the Board found below, the level of skill to which Yokoyama is addressed was "quite advanced" at the time the '456 patent was filed and that "one of ordinary skill in the art certainly was capable of providing the circuitry necessary to make the device operable for use as a computer." We discern no clear error in the Board's findings and conclude as a matter of law that Yokoyama is sufficiently enabling to serve as a section 102(b) reference.⁹ See *Gould v. Quigg*, 822 F.2d 1074, 1077, 3 USPQ2d 1302, 1303-04 (Fed. Cir. 1987) (ultimate issue of enablement is one of law based on underlying factual findings).

Accordingly, we affirm the Board's rejection of claims 1 and 18 as being anticipated by Yokoyama. As a result, we need not review the obviousness rejections of these claims. See *In re Baxter Travenol Labs*, 952 F.2d 388, 391, 21 USPQ2d 1281, 1285 (Fed. Cir. 1992) ("[S]ince anticipation is the ultimate of obviousness, the subject matter of these claims is necessarily obvious and we need not consider them further."). Additionally, because AST does not argue the patent-

ability of claims 9-12 and 19-27 separately from that of claims 1 and 18, the appeal of these claims also fails. See *In re Albrecht*, 579 F.2d 92, 93-94, 198 USPQ 208, 209 (CCPA 1978); *In re King*, 801 F.2d at 1325, 231 USPQ at 137.

Claims 2-4, 6, and 28-34

Next, AST challenges the Board's rejection of claims 2-4, 6, and 28-34 on the ground of obviousness. Obviousness is a question of law to be determined from the facts. *In re Fine*, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Thus, the Board's conclusion of obviousness is reviewed for error as a matter of law. *In re De Blauwe*, 736 F.2d 699, 703, 222 USPQ 191, 195 (Fed. Cir. 1984), and underlying factual inquiries are reviewed for clear error. *In re Caveney*, 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed. Cir. 1985).

1. Non-Analogous Art

AST argues that claims 2, 6, and 28-34, which add particular features to the hinge and latch means of the display housing,¹⁰ were erroneously rejected over non-analogous references directed to hinges and latches as used in a desktop telephone directory, a piano lid, a kitchen cabinet, a washing machine cabinet, a wooden furniture cabinet, or a two-part housing for storing audio cassettes. AST maintains that because the references pertain to fields of endeavor entirely unrelated to computers and are not pertinent to the problems faced by the present inventors, they do not render the claims obvious. It argues that the cited references, dealing with such articles as cabinets and washing machines, do not deal with the particular environment presented in portable computers. This argument rests on too narrow a view of what prior art is pertinent to the invention here.

[3] Whether a prior art reference is "analogous" is a fact question that we review under the "clearly erroneous" standard. *In re Clay*, 966 F.2d 656, 658, 23 USPQ2d 1058, 1060 (Fed. Cir. 1992). Although there is little dispute that the prior art references cited here (other than Yokoyama) are not within

⁹ We also note that under the enablement standard that AST would have us apply to Yokoyama, the '456 patent itself would be non-enabling. The '456 patent similarly relies on the knowledge and skill of those skilled in the art. If detailed disclosure regarding implementation of known electronic and mechanical components necessary to build a computer were essential for an anticipating reference, then the disclosure in the '456 patent would also fail to satisfy the enablement requirement. See *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1569, 7 USPQ2d 1057, 1063 (Fed. Cir. 1988).

¹⁰ Generally, claims 2 and 6, both depending from claim 1, recite torsion spring means and recessed latch means for the display housing, respectively. Claims 28, 29, 30, 33, and 34 are directed to a portable computer having concealed hinges, and claims 31 and 32 recite recessed latch means and retractable legs, respectively.

the same field of endeavor as computers, such references may still be analogous if they are "reasonably pertinent to the particular problem with which the inventor is involved." *Id.*; see also *Heidelberger Druckmaschinen AG v. Hantscho Commercial Prods., Inc.*, 21 F.3d 1068, 1072, 30 USPQ2d 1377, 1379 (Fed. Cir. 1994). The problems encountered by the inventors of the '456 patent were problems that were not unique to portable computers. They concerned how to connect and secure the computer's display housing to the computer while meeting certain size constraints and functional requirements. The prior art cited by the examiner discloses various means of connecting a cover (or lid) to a device so that the cover is free to swing radially along the connection axis, as well as means of securing the cover in an open or closed position. We agree with the Board that given the nature of the problems confronted by the inventors, one of ordinary skill in the art "would have consulted the mechanical arts for housings, hinges, latches, springs, etc." Thus, the cited references are "reasonably pertinent" and we therefore conclude that the Board's finding that the references are analogous was not clearly erroneous.

2. Secondary Considerations

In support of its contention that the Board erred in rejecting claims 2-4, 6, and 28-34 as obvious, AST points to evidence of commercial success, copying, and professional recognition of Grid laptop computers, devices covered by claims 1 and 18 of the '456 patent. For example, from the introduction of their laptop computers in 1983 to the end of 1990, Grid enjoyed cumulative sales of approximately \$489 million in addition to licensing royalties of \$7.5 million. Grid also received several design awards and exceptional praise from the industry press.

[4] Although such evidence is indeed impressive, AST has not shown that it is relevant to the claims at issue and thus entitled to weight. When a patentee offers objective evidence of nonobviousness, there must be a sufficient relationship between that evidence and the patented invention. See *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392, 7 USPQ2d 1222, 1226 (Fed. Cir.), *cert. denied*, 488 U.S. 956 (1988). "The term 'nexus' is used, in this context, to designate a legally and factually sufficient connection between the proven success and the patented invention, such that the objective evidence should be considered in the determination of nonobviousness. The

burden of proof as to this connection or nexus resides with the patentee." *Id.* Here, AST has failed to carry its burden.

AST limits its argument respecting the evidence adduced to demonstrate nonobviousness to laptop computers covered by claims 1 and 18, claims which we have previously concluded are unpatentable under section 102.¹¹ AST has not established that the commercial success, copying, and professional recognition experienced by Grid laptop computers are probative of the nonobviousness of the inventions of claims 2-4, 6, and 28-34. It has not been shown that such evidence is relevant to a computer within the scope of these claims, *i.e.*, that it is attributable to the inventions of these claims, rather than to extraneous factors such as advertising and marketing or to the features possessed by the computers of claims 1 and 18. Because AST has failed to establish a sufficient legal relationship between the purported evidence of nonobviousness and the claimed invention, evidence pertinent to claims 1 and 18 therefore carries no weight with respect to claims 2-4, 6, and 28-34.

3. Obviousness Generally

Beyond what we have said respecting the applicability of the cited prior art and the asserted evidence of secondary considerations, we have considered AST's basic contention that the prior art does not suggest the invention of the rejected claims and view it to be unpersuasive. In reviewing the Board's obviousness conclusions, we have been guided by the well-settled principles that the claimed invention must be considered as a whole, multiple cited prior art references must suggest the desirability of being combined, and the references must be viewed without the benefit of hindsight afforded by the disclosure. See *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir.), *cert. denied*, 479 U.S. 827 (1986). We have carefully reviewed the prior art of record and conclude that the Board did not err in rejecting claims 2-4, 6, and 28-34 as having been obvious.

¹¹ The only evidence connecting the purported commercial success and professional praise with the '456 patent is the declaration of J. Georg Seka, counsel for AST, stating that claims 1 and 18 cover the Grid "Compass" laptop computer and certain models made by Toshiba. Even assuming that a nexus exists as to those two claims, evidence of nonobviousness is irrelevant for patentability purposes when an invention is anticipated under section 102.

CONCLUSION

The Board did not clearly err in rejecting claims 1 and 18 as being anticipated by the Yokoyama reference. Consequently, the rejection of claims 9-12 and 19-27 must also be affirmed. The Board did not err in rejecting claims 2-4, 6, and 28-34 as being obvious over Yokoyama and other prior art. Accordingly, we affirm the decision of the Board.

AFFIRMED

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Circuit Court of Appeals, Third Circuit.
 EDISON ELECTRIC LIGHT CO.

v.

NOVELTY Incandescent LAMP CO.
 No. 3, October Term, 1908.

February 16, 1909.

Appeal from the Circuit Court of the United States
 for the Western District of Pennsylvania.

For opinion below, see 161 Fed. 549.

West Headnotes

Patents 291 ⚡26(2)

291 Patents

291II Patentability

291II(A) Invention; Obviousness

291k26 Combination

291k26(2) k. New Result. Most Cited

Cases

Invention may be found in a new structure, involving a readjustment of materials in use, by which new beneficial results are brought about. Decree, C.C.1980, 161 F. 549, reversed.

Patents 291 ⚡26(2)

291 Patents

291II Patentability

291II(A) Invention; Obviousness

291k26 Combination

291k26(2) k. New Result. Most Cited

Cases

Rearrangement of materials, in view of its difficulties as shown by efforts of other inventors and resulting advantages thereby secured, is patentable.

Patents 291 ⚡52

291 Patents

291II Patentability

291II(D) Anticipation

291k50 Prior Knowledge or Use

291k52 k. Accidental or Unintentional

Production. Most Cited Cases

A merely accidental occurrence, realizing the structure of a patent, not only not appreciated, but made the ground of rejection as an imperfection, is not an anticipation. Decree, C.C.1908, 161 F. 549, reversed.

Patents 291 ⚡65

291 Patents

291II Patentability

291II(D) Anticipation

291k63 Prior Patents

291k65 k. Sufficiency of Description.

Most Cited Cases

It is not an anticipation that by a mistake in the figure of a preceding patent by the error of the draftsman the structure of a patent appears contrary to the conception of the inventors and the reading of the patent. Decree, C.C. 1908, 161 F. 549, reversed.

*978 Richard N. Dyer and John Robert Taylor, for appellants.

A. Parker-Smith, for appellees.

Before DALLAS and GRAY, Circuit Judges, and ARCHBALD, District Judge.

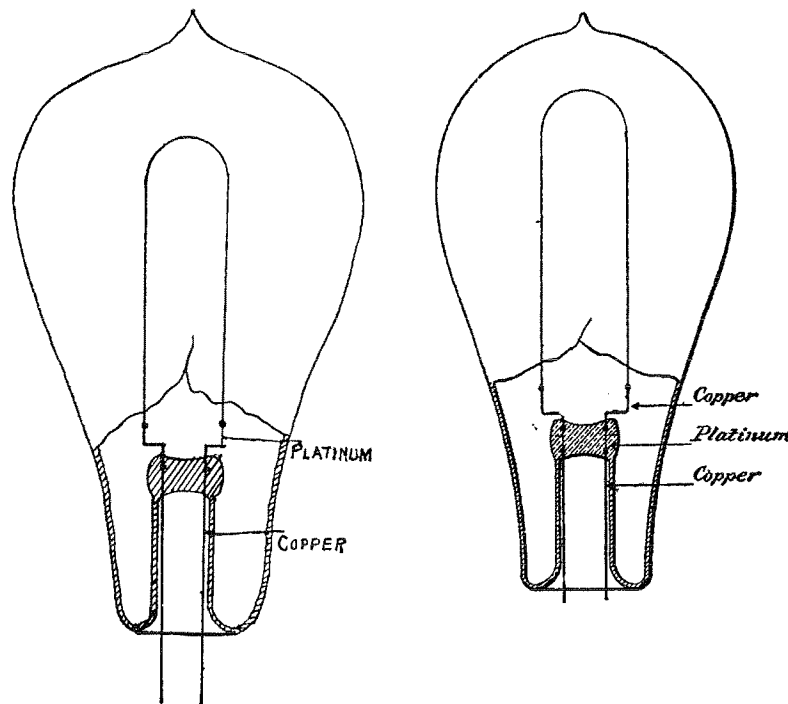
ARCHBALD, District Judge.

The patent in suit is for a leading-in wire for incandescent electric lamps. It was taken out by Thomas A. Edison, January 13, 1891, but, being found to be too broad, a reissue was obtained October 10, 1905, and it is on this that the suit is based. Infringement is admitted, the validity of the patent being the only question.

The leading-in wire of an electric lamp conducts the current to the filament within the bulb, and having to be sealed in, air-tight, where it enters the

bulb, in order to preserve the vacuum within, a metal must be employed whose coefficient of expansion is as near as may be to *979 that of the glass, or at least the particular kind of glass used, so that the two shall contract and expand together, the filament burning up if there is the slightest leakage. Platinum is found to be the best for the purpose, but being very rare and expensive, economy is enforced, and the smallest possible amount, both in length and size of wire, which will insure a perfect seal, is therefore to be employed. It is quite ductile also, and liable to stretch in consequence, which tends to impair the seal, requiring it to be re-

lieved of strain. The exterior ends of the wire have also to be rigid so that they will not sag and short-circuit, and the union of the platinum with the exterior copper section must be so secured as to avoid, so far as practicable, the breakage incident to handling in manufacture. These were the problems which confronted the inventor, and which he undertook to solve by the device of the patent.



There are two forms of construction shown, but with only one are we concerned. In this there is an inner section of the leading-in wire of platinum, connecting at one end with the filament and sealed into the glass at the other, and an outer section of copper to which the platinum is joined, the point of union being within the glass into which the copper section is led and sealed. The other construction had inner *980 terminals of copper between the

platinum and the filament, but was in other respects the same, and while admittedly the preferred form with the inventor, and employing the smallest amount of platinum, was found to be objectionable and was given up. The validity of the patent depends on whether, in contrast with the prior art, invention is so shown.

There is a suggested anticipation, because in practice, in other forms, such as the Heisler and Bern-

stein lamps, in which the exterior copper section is not led into the glass, it sometimes happened that the glass, by mistake, ran down on to and over the point of union with the platinum, thus realizing, as it is said, the construction of the patent. But no such accidental and fugitive occurrence is of account. 30 Cyc. 840. Not only was it not understood or appreciated, but it was actually made the ground of rejection, the lamp, when it happened, being regarded as imperfect and thrown out. It thus gave nothing to the world, standing in the way of discovery, indeed, instead of promoting it, and is thus entitled to no consideration here. Equally ineffective is it to urge that the Edison construction is disclosed by the Lemp and Wightman patent (401,444), where, by an error of the draftsman in one of the figures, the outer section of the leading-in wire is apparently made to extend into the glass. The inventors had no such conception, and no one reading the patent would get any idea of it, if, indeed, he would not perceive and correct the mistake. To accept it, under the circumstances, as a disclosure which advanced the art, anticipating the present invention, would reflect on the judgment of the court.

The patentability of the device is the real question. It was denied by the court below, on the ground that all the inventor did was to correct the mistaken idea entertained by the art, that, if the exterior or copper end of the leading-in wire was extended into the glass, it would crack the glass, and thus ruin the seal, and that recognition of this mistake was a mechanical truth and not an inventive act, for which no patent would lie. But that does not fairly state the case in all its parts. It is not like the condition in *Daylight Manufacturing Company v. American Prismatic Light Company*, 142 Fed. 454, 73 C.C.A. 570, as supposed. The method there pursued already appeared in the prior art, and its application to the production of rolled prism plate based on the discovery that, contrary to the conceived idea, such plate could be successfully annealed and cut, was properly held to involve no invention, the mechanism by which it was accomplished being essentially old. The prevailing opinion being that it was a use-

less product, the discovery that it was not, which was all that there was, could not be regarded as rising to the dignity of invention, nothing new for effecting it having been devised. But the structure on which invention is predicated here is unquestionably new, there being a readjustment of materials, by which new and highly useful results are brought about. The case in many features is like that of *Rainear v. Western Tube Company*, 159 Fed. 431, 86 C.C.A. 411, in which invention was found, although there was nothing more than a rearrangement of materials in common use to produce a nonrusting pipe-union joint. Indeed, the case here is stronger than that, for the principle of which *981 advantage was taken in that case, that brass and iron in contact would not rust, was well known; whereas, here, electric lamp makers labored under the impression that the imbedding and sealing in of the exterior copper section of the leading-in wire, which is of the essence of the invention, would crack the glass. Mr. Edison no doubt discovered that this was not the fact, and that the copper section could be so successfully sealed up. But, however important to it, that is not the whole invention, which is not to be so limited or classed, not to say that it is to be condemned, even if that should prove to be the case.

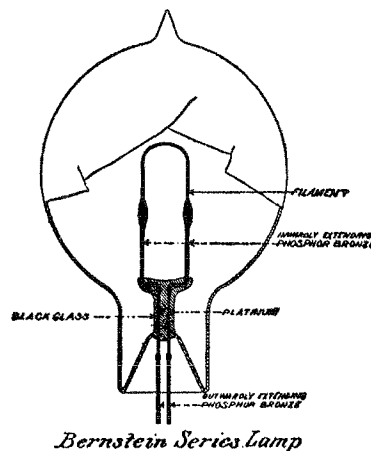
In what, then, does the claim to patentability consist? The prime object of the invention was the saving of platinum, and to this, in consequence, the mind of the inventor was particularly addressed. It is so declared in the specifications, and in every way stands confessed. This object was a worthy one, justifying the exercise of, if not engaging, the inventive faculties, platinum being a very precious metal, and the extent of its use entering largely into the cost and ultimate price of the lamp. And in this respect the success achieved was certainly most marked, the length of the platinum section being reduced to not exceeding an eighth of an inch, as contrasted with two-thirds to three-quarters of an inch in other lamps, and there being also a material reduction in the size of the wire, the money so saved amounting to from \$20,000 to \$30,000 a year in the

complainants' practice. It may be that, in the previous Edison patent (248,419) in one of the figures (4), a still greater economy of platinum is shown. But this, for some reason, was not a commercial success, and, the whole device being involved in any such comparison, it is with other lamps which have proved a success that contrast is the rather to be made.

Invention might well be made to rest on this alone, but economy in platinum is by no means the only benefit attained. When the platinum extends outside the glass, it is subject to a pulling strain, to which, being ductile, it is liable to yield, and being drawn out and reduced in size in this way, it shrinks away from the glass, impairing the seal. But by anchoring the outgoing copper in the glass, the strain on the platinum is removed, and with it the danger of leakage, insuring a practically perfect seal. It is because of this that with less platinum there are better results. It is said that, as an offset, the copper brings in gas bubbles. But none are observable about the platinum, and it is there that they particularly count, and, whatever theorizing as to this may be indulged

in, it is established by the evidence that, with the copper extended into and sealed up with the glass, a greater percentage of perfect seals is secured, and theory must yield to proof.

Another important feature is the rigidity obtained in the outgoing wires. If these sag, there is a danger of short-circuiting, destroying the lamp, which not infrequently occurs where the platinum extends beyond the glass. Stability is also required, the breakage of the wires in handling in course of manufacture being a not inconsiderable source of loss. Both of these defects, however, are remedied, and the corresponding advantages obtained, by carrying the copper into and imbedding it within the seal, the copper ends outside of it not sagging *982 like the platinum, and an effective protection, both of the platinum and of the copper and platinum union, being afforded thereby.



With all these useful features, which, if not altogether new, are not found united in any previous device, why, it may be asked, is not invention shown? No doubt, the extending of the exterior copper section into the glass is of its essence, being that from which pretty much everything else flows.

It is true, also, that the art did not believe that this could be successfully done, being dominated with the idea that it would break the seal. But, as already stated, the invention does not stop with the correction of that mistake. There may be that, but there is more, and, to so confine it, it must appear that the resulting benefits, with that out of the way, were

known. It is said that the construction adopted in the patent was obvious from the reverse construction shown in the Heisler and Bernstein lamps, where an inner copper or bronze section, supporting the filament, is extended down into and sealed up in the glass, where the union with the platinum takes place. But it is always hazardous to assert the obviousness of a device which no one, with the whole art before him, up to that time has conceived. Nor were the benefits of the patented structure to be reasoned out, unaided, as maintain. The ordinary explanation, for instance, would be that the more platinum, the better the seal, and not, as demonstrated, that, other things combining, a more perfect seal could be secured with less. The defendants' expert, as it would seem, is not even yet convinced. Neither was it to be supposed that, aside from the question of breakage, the copper, with its greater coefficient of expansion, on being extended into the glass, would somehow hold. Above all, was there nothing in the Heisler and Bernstein construction to suggest a solution by the mere turning of it upside down. The platinum there extended outside the glass, where the union with the copper was formed, with all the resulting disadvantages which it was the object of the present invention to overcome. But it is somewhat difficult to see how, by mere observation, as something lying on the surface, it would be recognized that they would disappear, if only this construction was turned around. It may be, as a mere naked conception, that the reverse construction did not go unobserved. But upon what consideration can it be declared that it was at the same time apprehended that thereupon all the benefits as we now know them (only so that the glass did not crack) would immediately ensue? The fact is, as the record shows, dispelling any such idea, that not a few inventors, including Mr. Edison himself, had for *983 some time been busied in the effort to secure a satisfactory arrangement of leading-in wires, and the different means taken for doing so, better than anything else, shows the complexity of the problem involved, and that in order to meet it something more than ordinary skill was required. To deny to its successful solution the merit of in-

vention upon the contrary idea is to declare that these efforts were needless, and that there was already disclosed in the art an easy and obvious way out, which ought to have been, but somehow was not, seen. We are not, however, to be persuaded to that view. On the contrary, we think that the successful method of dealing with the subject, and particularly the method here adopted, was inobvious, if not obscure, calling for inventive insight to develop and discern, and that the patent, therefore, should have been sustained.

The decree is reversed, and the bill reinstated, with directions to refer the case to a master to state an account. The patent having expired since suit brought, no injunction will go out.

C.A.3 1909.
Edison Electric Light Co v. Novelty Incandescent Lamp Co
167 F. 977, 93 C.C.A. 387

END OF DOCUMENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of
K. Inoue

Serial No.: 10/800580

Filed: March 15, 2004

For: WET PAPER WEB TRANSFER BELT

Confirmation No. 1657

DECLARATION UNDER 37 C.F.R. §1.132

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Kenji Inoue, having been warned that willful false statements and the like are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and may jeopardize the validity of the above-captioned application and any patent issuing thereon, declare:

(1) I am a citizen of Japan, residing in Tsuchiura-shi, Ibaraki-ken, Japan.

(2) I received a degree in applied chemistry from Yamagata University in 1992.

(3) I have been employed by Ichikawa Co., Ltd. continuously since 1992, assigned to development laboratory after 10 months of working in personnel department.

(4) I am the sole inventor of the above-captioned U.S. patent application, and familiar with its subject matter, the prior art cited against it by the U.S. Patent and Trademark Office, and the grounds of rejection asserted in the Official action of May 8, 2008.

(5) As a result of my educational background and employment at Ichikawa Co., Ltd., I have become, and am currently, aware of the level of ordinary skill in the design and manufacture of wet paper web transfer belts as of the period from around March 15, 2002, the U.S. filing date of Hagfors U.S. patent publication No. 2002/0137416, to March 19, 2003, the filing date of the Japanese patent application on which my U.S. patent application claims priority.

(6) The second ground of rejection of the subject patent application is based on the assertion that Hagfors' example 2 describes fibers that differ in dtex, but are all hydrophilic. However, Hagfors' description in the specification is vague in my opinion. According to the description, in Hagfors' example 2, all the fibers are hydrophilic. On the other hand, the description in paragraphs 0012, 0013, Figure 2, and Claim 1 of the published patent application, lead to no other conclusion than that the "hydrophobic" areas of Hagfors' wet paper web transfer belt are due to the presence of "hydrophobic fibers."

(7) Therefore, in my opinion, a person having ordinary skill in the art of designing and manufacturing wet paper web transfer belts, having considered the disclosure of Hagfors in its entirety in the interval from around March 2002 to March 2003, would have concluded that Hagfors' example 2 is in error

and cannot reasonably be understood to mean what it appears to say, namely, that all the fibers are PA (hydrophilic) fibers. In my opinion, the absence of an explicit description of "hydrophobic fibers" in example 2 is nothing more than an example of the overall vagueness of Hagfors' description.

(8) All of the statements made herein of my own knowledge are true, and all statements made herein on information and belief are believed to be true.

September 1, 2008
Date

Kenji Inoue
Kenji Inoue

X. Related Proceedings Appendix

None.